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UF/IFAS Nutrient Management Recommendation Series: Watermelon[1]

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This publication presents to growers the official UF/IFAS nutrient management recommendations for watermelon grown on mineral soils based on crop nutrient requirements determined by the UF/IFAS vegetable program and soil tests performed by the UF/IFAS Extension Soil Testing Laboratory.

General Information

- UF/IFAS fertilization and liming recommendations are advisory in nature and emphasize efficient fertilizer use and environmentally sound nutrient management without losses of yield or crop quality.
- Recommendations assume that nutrients will be supplied from commercial fertilizer, and expected crop yields and quality will be typical of economically viable production.
- Recommendations assume straight fertilizers (i.e., single nutrient sources) will be used to apply nutrients. If multi-nutrient fertilizers will be used, the fertilizer analysis should align with recommended nutrient rate ratios.
- Consider UF/IFAS recommendations in the context of the overall nutrient management strategy. Evaluate fertilizer rates, timing, placement, and source for efficiency and consider the return on fertilizer investment.
- If organic soil amendments are applied, understand and account for nutrient contributions and other benefits of adding organic matter.
- For best results, follow these recommendations in their entirety. The UF/IFAS recommendation is a holistic combination of fertilizer rates plus nutrient management aspects including irrigation.

Soil Test Interpretations for Watermelon

Table 1. For crop production on acidic, mineral soils. Extractant: Mehlich 3.

Nutrient	Interpretation (mg/kg)		
	Low	Medium	High
P	≤25	26 – 45	>45
K	≤35	36 – 60	>60
Mg	≤20	21 – 40	>40

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Fertilizer Rates

Table 2. Target pH and recommended annual N, P_2O_5, and K_2O fertilizer rates for watermelon on mineral soils. Phosphorus and potassium rates are based on the interpretation of a Mehlich-3 soil test.

Crop	Target pH	lb/acre/cropping season						
		N	P_2O_5			K_2O		
			Low	Med	High	Low	Med	High
Watermelon	6.0	150	120	100	0	120	100	0

- Indicated fertilizer rates, plus the nutrients already in the soil, will satisfy the crop nutrient requirement for this cropping season. Excessive fertilization has been shown to reduce fruit yield quality in watermelon.
- On soils that have not been farmed within the past two years or where micronutrients are known to be deficient, apply 5 lb Mn, 3 lb Zn, 4 lb Fe, 3 lb Cu, and 1.5 lb B per acre. Because some micronutrients can build up in the soil, soil testing should be used to monitor micronutrient status every two years, avoiding micronutrient toxicity. When deciding on micronutrient applications, consider which micronutrients are added to the crop via fungicides.
- When the soil tests medium or lower in magnesium (Mg), applying up to 40 lb Mg/acre might be needed. When liming is recommended, Mg can be supplied in fertilizer or from dolomitic limestone. Calcium (Ca) concentrations are typically sufficient in most soils farmed continuously or where the Mehlich-3 Ca index is >300 ppm. Ca is added during liming activities and from calcium carbonate present in irrigation water drawn from aquifers in Florida. These sources should be considered when determining Ca fertilizer needs.

Fertilizer Timing

- Transplants may benefit from the application of a dilute, soluble starter fertilizer, especially with cool soil temperatures. Starter solution rates of N and P_2O_5 need not exceed 10–15 lb/acre each.

Non-mulched Crops

- Fertilizers should be applied in split applications to reduce leaching losses and lessen the danger of fertilizer burn.
- Broadcast all P_2O_5, all micronutrients, if any, and 25%–30% of the N and K_2O in the bed at planting.
- Apply the remaining N and K_2O in sidedress bands during the early part of the growing season.
- Additional supplemental sidedress applications of 30 lb N/acre and 20 lb K_2O/acre should be applied only if total water application (rainfall plus irrigation) amounts exceed 3 inches within a three-day period or exceed 4 inches within a seven-day period.

Mulched Crops

- If irrigation is **subsurface**, incorporate 10%–20% of the N and K_2O, all of the P_2O_5, and all micronutrients, if any, into the bed. Apply the remainder of the N and K_2O 2–3 inches deep in one or more bands about 6–10 inches from the plants. Inject fertilizer through the side of the bed if a significant leaching event occurs.
- For **drip irrigation**, incorporate 20%–40% of the N and K_2O, all of the P_2O_5, and all micronutrients, if any, into the bed. Apply the remainder of the N and K_2O periodically through drip lines according to the rate and stage of crop growth.
- For management systems where **both subsurface and drip irrigation** are being used, apply no more than 20% of the N and K_2O, all of the P_2O_5, and all micronutrients, if any, into the bed. Apply the remainder of the N and K_2O periodically through drip lines according to the rate and stage of crop growth.
- For **overhead** irrigation, incorporate all of the N, P_2O_5, K_2O, and micronutrients, if any, into the bed prior to installation of the plastic mulch.

Other Considerations

- In some locations, it is not feasible to lower the water table where it is naturally high. To minimize water application in these situations, reduce the need for fertigation by increasing the proportion of nutrients incorporated into beds.

Fertilizer Placement

- Broadcast, band, sidedress, inject, or incorporate fertilizer into the soil depending on the nutrient. Rates in Table 2 should be followed for optimum yield and quality.

Fertilizer Sources

- Supply 25%–50% of the preplant N in the nitrate form if soils were treated with multipurpose fumigants or if the soil temperature will stay below 60°F for up to one week following transplanting or germination.
- 25%–30% of the N may be supplied from slow-release N sources, like sulfur-coated urea or isobutylidene diurea (IBDU), or from controlled-release (CRF) sources, like polymer-coated fertilizers.

- Research has shown that using polymer-coated CRFs in the drip-irrigation of watermelon can reduce leaching. If appropriately coated, CRF can efficiently supply either partial or entire-season N and K with no yield or quality loss.
- For mulched crops, polymer-coated CRFs, as with water-soluble fertilizers, should be incorporated to prevent a premature, heat-triggered release of nutrients from the material.
- If organic fertilizers are applied, understand and account for nutrient contributions to the current crop and future crops based on time of availability. Likewise, account for nutrient contributions from organic fertilizers applied to previous crops.

Water Management

- Fertilizer and water management are linked. Maximum fertilizer efficiency is achieved only with close attention to water management.
- Supply only optimum irrigation water to satisfy crop requirements. Excess irrigation may result in nutrient leaching, creating possible plant deficiencies. Soluble N and K fertilizers are especially vulnerable to leaching early in the season, prior to substantial root development.
- For subsurface irrigation, maintain a constant water table between 18 inches (at planting) and 24 inches (near harvest) below the top of the bed. A fluctuating water table will increase the chance of nutrient loss below the root zone.
- Consult EDIS publications #AE259, "Scheduling Tips For Drip Irrigation of Vegetables," and #AE260, "Principles and Practices of Irrigation Management for Vegetables" for information on injection schedules.

Reference

Hochmuth, G., and E. Hanlon. 2020. "A Summary of N, P, and K Research with Watermelon in Florida." SL325. Gainesville: University of Florida Institute of Food and Agricultural Sciences. https://edis.ifas.ufl.edu/publication/CV232